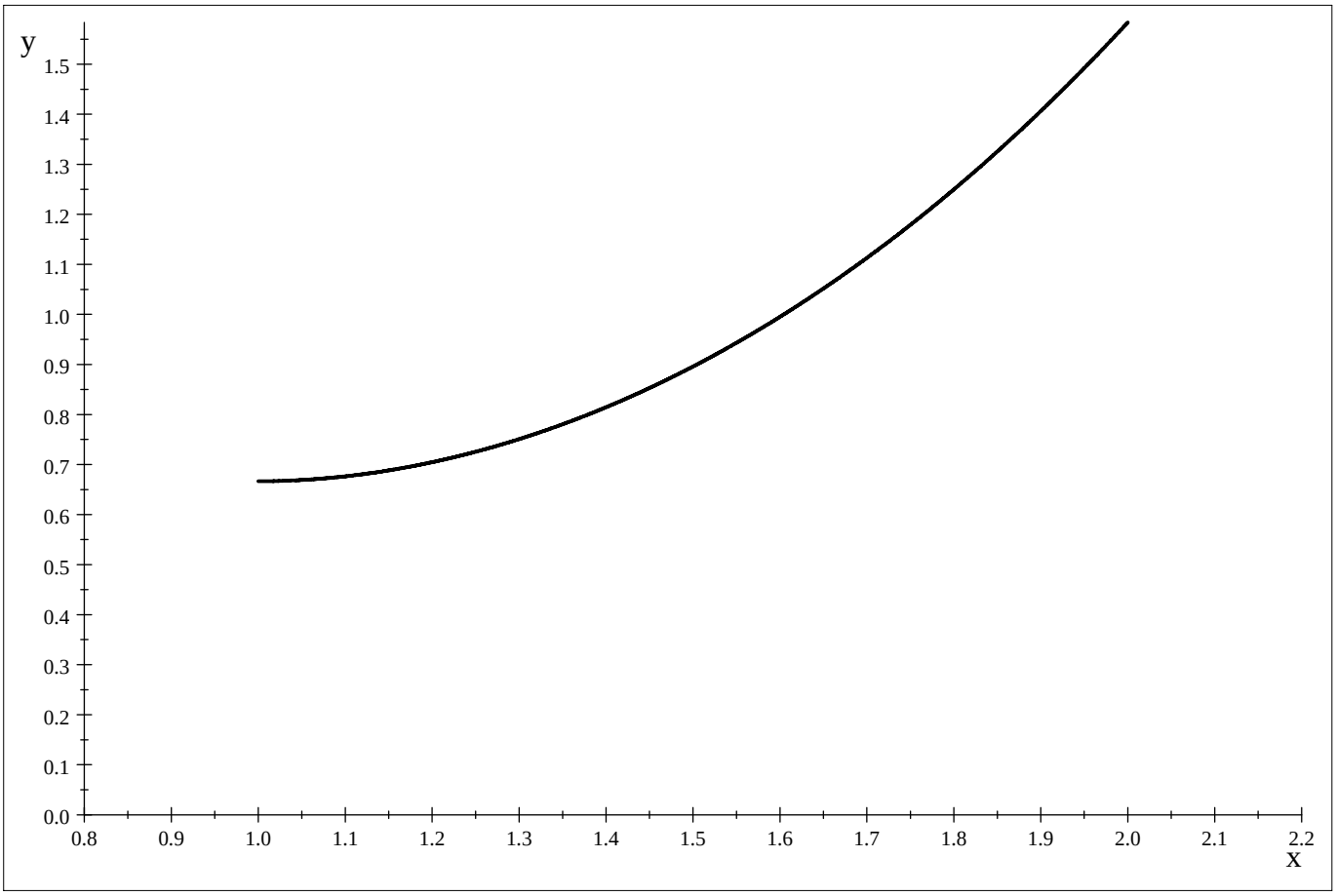
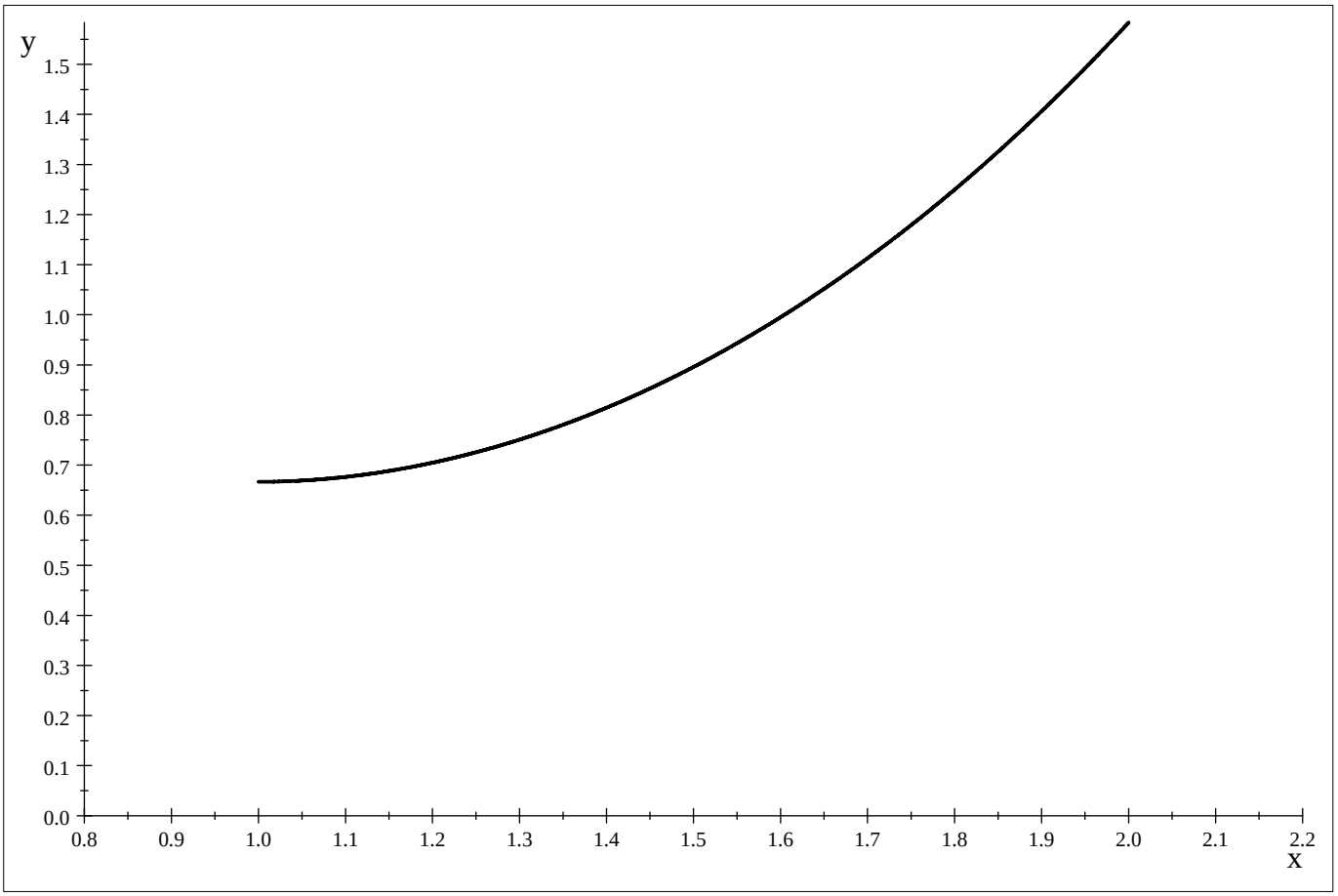
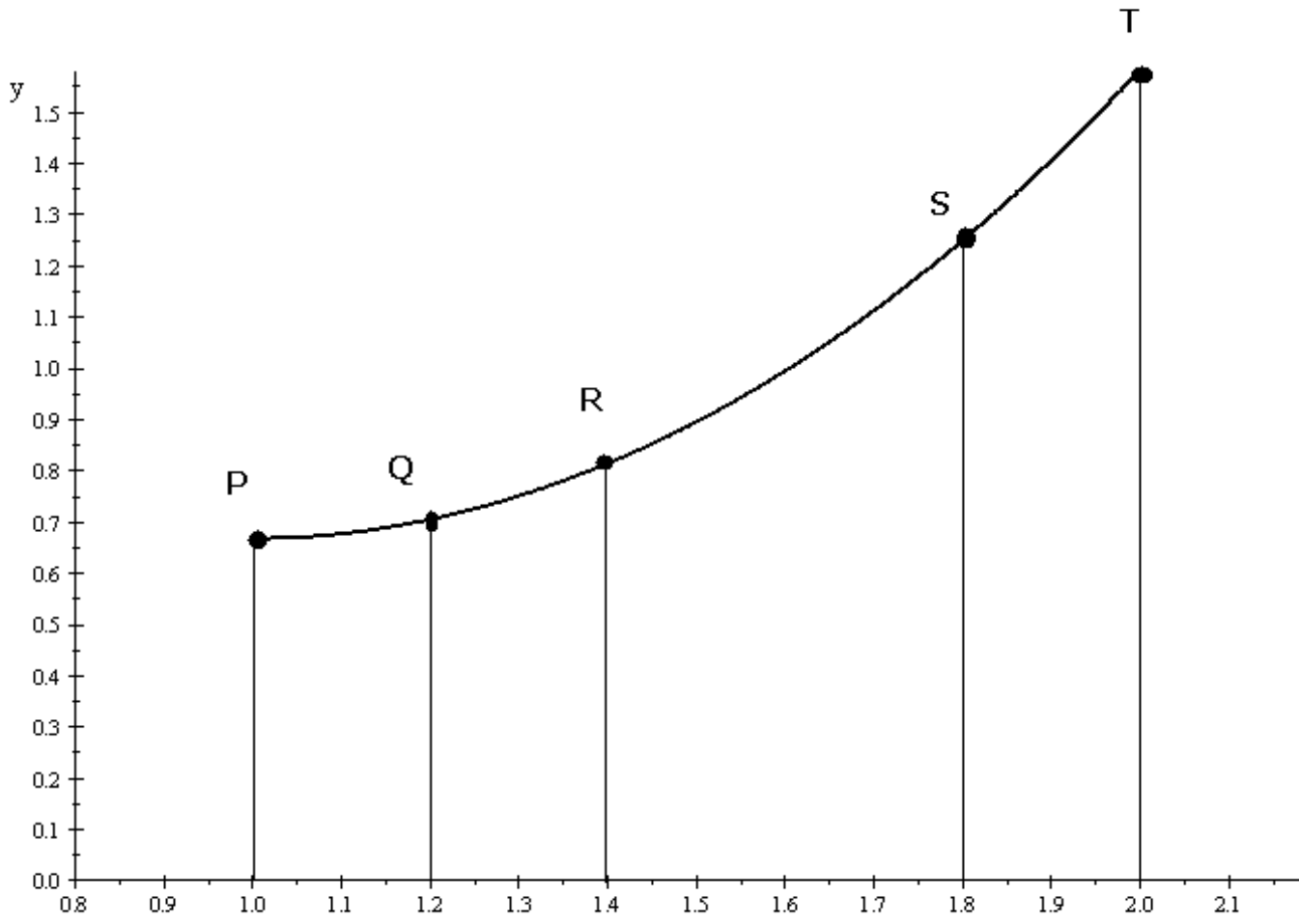
Some Practice Questions for the Test2

Your Test will be Different

1. a) A graph of $y = \frac{x^3}{6} + \frac{1}{2x}$ **is given below.for** x **in** $[1, 2]$




y
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2.0
2.1
2.2
x



I) Find the sum of the distances |PQ|,|QR|,|RS|,|ST|

II) Use the arc length formula to compute the length of the arc of the graph from P to T

Write the absolute value of the difference between the answers in parts I) and part II)

b) Find the area of the surface of revolution obtained by revolving the graph of $y = \left(2x - x^2\right)^{1/2}$

for $0 \leq x \leq 2$ **about the x-axis**.

2. **Evaluate**

a) $\int x^5 e^x dx$

b). $\int x^2 \ln x dx$

3. **Evaluate**

a). $\int x \tan^{-1} x dx$

b). $\int \sin \sqrt{x}\, dx$

4.**Evaluate** $\int \sec^5 x dx$

5. **Evaluate** $\int \sin^3 x \cos^3 x dx$

6. **Evaluate** $\int \sin^2 x \cos^2 x dx$

7. **Evaluate** $\int \frac{x^2}{\sqrt{4-x^2}} dx$

8. **Evaluate** $\int \frac{x^2}{\sqrt{9+x^2}} dx$

9. $\int \frac{23x+2x^2-75}{x^3-2x^2-25x+50} dx$

10. $\int \frac{x-6}{x^2-2x+1}\,dx$

11. $\int \frac{10x - x^2 + 20}{8x + x^2 + x^3 - 60}\, dx$

12 . **Find the limit (exact value) of the following sequence if it exists**

a) $\{\tan^{-1} n\}$

b) $\{n \sin(\frac{1}{n})\}$

c) $\left\{\sin\left(\frac{(2n+1)\pi}{4}\right)\right\}$

d) $\left\{\frac{3n^2-n+1}{5n^2}\right\}$

e) $\left\{\frac{n-5}{n^3+2n+7}\right\}$

f) $\left\{\frac{n^3+1}{10000n^2+5}\right\}$

g) $\left\{\sqrt{n^2+n} - n\right\}$

13. Which of the following series converges or diverges. Find the sum (exact value) in the case of convergence.

a)

$$\sum_{n=1}^{\infty} \left(\tan^{-1}\sqrt{3}\right)^n$$

b)

$$\sum_{n=1}^{\infty} \left(\tan^{-1}\left(1/\sqrt{3}\right)\right)^n$$

c) $17 + 8 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots\ldots$

d)

$$\sum_{n=1}^{\infty} \frac{1}{(2n+1)(2n+3)}$$

14 . Use the integral test to determine which of the following converges

a) $\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

b) $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$

c) $\sum_{n=1}^{\infty} \frac{n^2}{e^n}$

15. Find the least positive interger N so that the remainder after adding N terms of the series $\sum_{n=1}^{\infty} \frac{1}{n^5}$ is less than 0.00001